REMARKS/ARGUMENTS

Favorable reconsideration of the present application is respectfully requested.

The non-elected Claims 5-9 have been canceled. Claims 2-4, 1 and 12 have been allowed, subject to the correction of minor errors in Claims 2 and 3, which correction has been provided in the present response.

Claims 1 and 10 have been rejected under 35 U.S.C. § 102 as being anticipated by U.S. patent 6,563,530 (Oyama et al). Claims 1 and 10 have been amended to clarify that the reference mark is provided at a stationary position on the base frame. Basis for this is evident from Figure 6 and will be further explained in the following discussion. Applicants respectfully submit that the amended Claims 1 and 10 also define over Oyama et al.

According to a feature of the invention set forth in Claims 1 and 10, a positional relation between optical axes of a board recognizing camera, fixed on a movable frame supported on a base frame of an electronic component mounting apparatus, and a component recognizing camera fixed on the base frame, is calculated based on respective positional relations of a reference mark relative to the optical axes of the component recognizing camera and the board recognizing camera. For example, referring to the non-limiting embodiment illustrated in Figures 1, 3, 5 and 6, a supporting table 16 of a base frame 11 mounts a support member 17 on which a reference gauge G may be positioned (Figure 6). The reference gauge is provided with one or more reference marks Gm, and so a reference mark is provided "at a stationary position" on the base frame. A component recognizing camera 15 is also mounted on the base frame 11 (Figures 1, 5 and 6) such that the reference mark at the stationary position resides in the visual field of the component recognizing camera 15 (Figure 6).

A movable table 24 is supported on the base frame 11 and is movable in the X and Y directions (Figure 1). A component placing device 26 is supported by the movable table, as is a board recognizing camera 25.

In order to calculate a positional relationship between the optical axis O1 of the board recognizing camera 25 and the optical axis O2 of the component recognizing camera 15, the reference stage is placed on the support member 17, so that a stationary reference mark Gm resides in the visual field of the component recognizing camera 15. The movable table 24 is then moved to a predetermined position such that the reference mark Gm also comes into the visual field of the board recognizing camera 25 (paragraph bridging pages 13-14). The distances X5 and Y5 between the optical axis O1 and O2 are then calculated according to equations 1a, 1b, 2a, and 2b, which equations incorporate the positional relations of the reference mark Gm relative to the optical axes O1 and O2. For example, X5 is the sum of Xa and Xb, wherein Xa is the distance between the optical axis O1 and the reference mark Gm, and Xb is the distance between the optical axis O2 and the reference mark Gm. Thus the stationary reference mark Gm can be used for a simplified positional relation calculation for the optical axis of the cameras.

Oyama et al, on the other hand, lacks a teaching of a method providing a reference mark at a stationary position on a base frame to reside in the visual field of a component recognizing camera. According to Oyama et al, a dummy component 40 which incorporates a reference mark is picked up from a dummy component storing device 31 and moved to a location opposed to a component sensing camera 13, to be sensed by the camera 13 (step S14 in Fig. 7). The mounting head 12 having the dummy component thereon is then brought to an image taking table 32 (step S16), and the distance of motion from the component sensing camera 13 to the table 32 is measured (column 13, lines 33-39). A board sensing camera 11 is then brought to the image taking table 32 (step S18) and the dummy component 40 is sensed by the board sensing camera (column 13, lines 49-55).

Thus, rather than calculating a positional relation between optical axes of a board recognizing camera and a component recognizing camera based on respective positional

relations of a reference mark at a stationary position, the reference mark (dummy component 40) is moved between the component sensing camera 13 and the image taking table 32 before the board sensing camera 11 is positioned to sense the dummy component. *This accordingly requires a more complex calculation which must take into consideration the distance of movement of the dummy component between the sensing position of the camera 13 and the table 32.* Amended Claims 1 and 10, which now recite that the reference mark is provided "at a stationary position" on the base frame, that the movable table is positioned to make the reference mark at the stationary position come in the visual field of the board recognizing camera, and that the calculation of the positional relation between the optical axes of the board recognizing camera and the component recognizing camera is based on respective positional relations of the reference mark at the stationary position relative to the optical axes of the component recognizing camera and the board recognizing camera, therefore clearly define over this reference.

Applicants therefore believe that the present application is in a condition for allowance and respectfully solicit an early Notice of Allowability.

Respectfully submitted,

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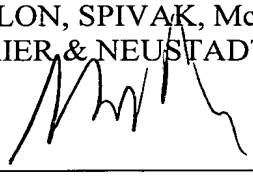

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